

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 97-200

SWIS # 10-AA-0009

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF FRESNO
FOR
CONSTRUCTION AND OPERATION
AMERICAN AVENUE MUNICIPAL SOLID WASTE LANDFILL
FRESNO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The Fresno County Department of Public Works and Development Services (hereafter Discharger) owns and operates a municipal solid waste landfill approximately 5 miles southwest of the City of Kerman, in Sections 32 and 33, T14S, R17E, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order.
2. The 440-acre waste management facility currently consists of an unlined waste management unit covering 30 acres (Phase I) and a 66-acre composite-lined waste management unit (Phase II), as shown in Attachment B, which is incorporated herein and made part of this Order. The facility is comprised of Assessor's Parcel Numbers (APN) 020-052-02S, -05ST, -06, and -09S; and 020-21-26S, -27, -33ST, -34ST, and -35ST.
3. The construction of Phase II, comprising approximately 160 total planned acres, began in May 1992 with the construction of Module 1. To date, contiguous modules 1, 2, 3, and 4 of Phase II have been completed (66 total acres). The Discharger intends to expand the waste management facility by constructing Phase III (250 acres) upon completion of Phase II.
4. On 22 June 1990, the Board adopted Order No. 90-182, which prescribes waste discharge requirements for the existing waste management facility. The facility was classified as a Class III landfill which accepts municipal solid waste in accordance with Title 23, California Code of Regulations, §2510, et seq. (Title 27).
5. On 17 September 1993, the Board adopted Order No. 93-200, amending Order No. 90-182 and implementing State Water Resources Control Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste.

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6. This Order revises the waste discharge requirements for the facility in conformance with the California Water Code and Title 27, California Code of Regulations, Section 20005 et seq. (Title 27), and the revisions and policies adopted thereunder, and removes the facility from Attachment 1 of Order No. 93-200.
7. The waste management facility has an anticipated remaining capacity of 32 million cubic yards and is anticipated to reach capacity by the year 2029. The current discharge rate is about 1,650 tons per day of municipal solid waste, and is anticipated to reach approximately 2,200 tons per day by the year 2028.

SITE DESCRIPTION

8. The facility is in a topographically flat region of the Tulare Lake Hydrologic Basin of the San Joaquin Valley. The native ground surface elevation ranges between approximately 190 feet above mean sea level at the northeast boundary of the facility and 180 feet above mean sea level at the southwest facility boundary. The ground surface slopes approximately 5 feet per mile toward the southwest.
9. The waste management facility is on Quaternary alluvial deposits. The soils underlying the facility are fine-grained sandy-loam soils.
10. The hydraulic conductivity of the native soils underlying the waste management unit range between 1×10^{-3} cm/sec and 1×10^{-5} cm/sec.
11. The waste management facility is not within a fault hazard zone. The Maximum Probable Earthquake affecting the facility is a Magnitude 8.3 earthquake on the San Andreas Fault, approximately 48 miles to the southwest. Estimated ground acceleration values from this event range between 0.07g and 0.25g.
12. Land within 1,000 feet of the facility is used for agriculture, housing, and open space.
13. The facility receives an average of 8.6 inches of precipitation per year as measured at the Mendota Dam and Madera weather stations. The mean evaporation for this facility is 81.9 inches per year as measured at the same stations. The average annual net evaporation at the facility is 73.3 inches.
14. The 100-year, 24-hour precipitation event for the facility is estimated to be 2.86 inches, as calculated by a Pearson type III distribution.

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15. The existing waste management facility is not within a 100-year floodplain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Community-Panel Number 065029 1150B. However, a portion of the northeast corner of the proposed expansion Phase III area is within a 100-year flood zone (Zone A) according to the FEMA Map.
16. There are 37 municipal, domestic, industrial, or agricultural supply wells within a 1-mile radius of the site. No surface springs or other sources of groundwater supply have been observed.
17. Order No. 90-182 required the Discharger to submit a copy of the Record of Survey for at least two permanent survey monuments in accordance with a time schedule. The Discharger has not submitted the Record of Survey in accordance with Order No. 90-182.

SURFACE AND GROUND WATER CONDITIONS

18. The Board adopted the *Water Quality Control Plan for the Tulare Lake Basin, Second Edition* (hereafter Basin Plan) which designates beneficial uses and contains water quality objectives for all waters of the Basin. This order implements the Basin Plan.
19. Surface runoff drains southwest towards the James Bypass of the Fresno Slough in the Lower Kings River Hydrologic Area (551.80) of the Tulare Lake Basin. The Fresno Slough discharges to the San Joaquin River.
20. The designated beneficial uses of surface waters on the valley floor, as specified in the Basin Plan, are agricultural supply, industrial service and process supply, contact and noncontact water recreation, warm fresh water habitat, preservation of rare, threatened and endangered species, and groundwater recharge.
21. The first encountered groundwater is approximately 90 to 110 feet below the native ground surface. Groundwater elevations range from 75 feet MSL to 95 feet MSL.
22. Monitoring data indicates that the groundwater is unconfined. The depth to groundwater fluctuates seasonally as much as 20 feet.

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23. The direction of groundwater flow is toward the southeast. The average groundwater gradient is approximately 0.0025. The average groundwater velocity is 1 foot per year. The direction of groundwater flow varies seasonally and periodically flows toward the south during the high agricultural demand season.
24. The Discharger's consultant indicated in a report that the existing background monitoring well (see Finding Nos. 32 and 33) is not representative of the groundwater aquifer being monitored by the compliance wells. However, monitoring data from a nearby agricultural well sampled periodically between September 1987 and September 1990 indicates that areal groundwater quality is generally good, with a specific electrical conductivity ranging from 350 to 940 $\mu\text{mhos/cm}$ and Total Dissolved Solids ranging from 165 to 587 mg/l.
25. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal, agricultural, and industrial supply.
26. State Water Resources Control Board Order No. 91-13-DQ (General Permit No. CAS000001), amended 17 September 1992, specifies waste discharge requirements for discharges of storm water associated with industrial activities, excluding construction activities, and requiring submission of a Notice Of Intent by industries to be covered under the permit. Waste disposal at landfills, including inert disposal facilities, is considered an industrial activity requiring submittal of a Notice Of Intent for coverage under the general permit if storm water is to be discharged off-site. Storm water runoff is collected at the existing retention basin near the southwest corner of the Phase II expansion area, in accordance with an approved drainage plan, and the submission of a Notice of Intent is therefore unnecessary.
27. The Discharger's proposed detection monitoring program for groundwater for this Waste Management Unit complies with the requirements contained in Subchapter 3 of Chapter 3 of Title 27.

WASTE AND SITE CLASSIFICATION

28. The Discharger proposes to discharge putrescible and nonputrescible municipal solid wastes, including garbage, food and beverage containers, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, vehicle parts, discarded home and industrial appliances, manure, vegetable wastes, and wood and green wastes. These wastes are classified as 'nonhazardous solid waste' or 'inert waste' using the criteria set forth in Title 27 for a Class III landfill.

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29. The site characteristics where the waste management unit is located (see Finding Nos. 9 and 10) do not meet the siting criteria for a Class III landfill contained in §20260(a) and (b)(1) of Title 27. As such, the site is not suitable for the discharge and containment of Class III wastes. Therefore, in order to discharge the wastes described in Finding No. 28, additional waste containment measures are required in accordance with §20260(b)(2) of Title 27 and State Water Resources Control Board Resolution No. 93-62.
30. The Discharger proposes a liner system which will be designed, constructed, and operated to prevent migration of wastes from the waste management unit to adjacent natural geologic materials, groundwater, or surface water during disposal operations, closure, and the post-closure maintenance period in accordance with the criteria set forth in Title 27 for a Class II landfill, and the provisions in State Water Resources Control Board Resolution No. 93-62 for municipal solid wastes.

GROUNDWATER MONITORING

31. The Discharger is required to monitor the groundwater and vadose zone in accordance with Subchapter 3 of Chapter 3 of Title 27.
32. The existing groundwater detection monitoring system consists of one background monitoring well (BMW-1) and ten downgradient monitoring wells (DMW-1, DMW-2, DMW-3, DMW-4, DMW-5, DMW-6, DMW-7, DMW-8, DMW-9, and DMW-10) as shown in Attachment B. The downgradient wells are sampled quarterly as two subsets on an alternating basis (even-numbered wells during the 2nd and 4th quarters, odd-numbered wells during the 1st and 3rd quarters). This monitoring network, installed in 1987, was designed to monitor along the point of compliance of the Phase I area only, and does not incorporate the Phase II or Phase III expansion areas. The Discharger has proposed a detection monitoring program that changes the sampling frequency to semi-annual while changing the system to include only downgradient wells DMW-2, -4, -6, -8, and -10 along the point of compliance for the Phase I area. In addition, the Discharger proposes to install two additional detection monitoring wells (DMW-11 and DMW-12) to monitor along the point of compliance for the expansion Phase II area.
33. Several inorganic constituents exhibit greater concentrations in the existing background monitoring well (BMW-1) than those detected in the downgradient wells, suggesting that the existing background well is not representative of the same groundwater body being

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monitored by the downgradient wells. The general mineral characteristics of groundwater samples collected from BMW-1 suggests that it is installed in a chemically different aquifer than that of the downgradient wells. The Discharger proposes to install a replacement background monitoring well (BMW-2).

34. The existing vadose zone monitoring network consists of two vadose zone monitoring stations installed within the subgrade of each of the four modules of Phase II, one near the middle of the module and one beneath the module's leachate collection sump. Each station consists of two suction lysimeter/soil moisture block systems (16 lysimeters total) and ancillary extension lines and access riser pipes. In addition, one suction lysimeter has been installed to provide for background vadose zone monitoring.
35. The Discharger needs to submit an Evaluation Monitoring Program proposal in accordance with Subchapter 3 of Chapter 3 of Title 27. The required proposal has not been submitted.
36. Order No. 90-182 required the Discharger to submit a Water Quality Protection Standard report in accordance with Chapter 15 for groundwater and vadose zone monitoring at the facility by 15 October 1991 and 15 June 1992, respectively. Order No. 93-200 required the submission of a Water Quality Protection Standard report by 1 January 1994. The Discharger has not submitted the required Water Quality Protection Standard report.

GROUNDWATER DEGRADATION

37. Volatile organic constituents were first detected in groundwater when the detection monitoring wells were installed in 1987. Several constituents were detected in 1987 at concentrations below primary water quality standards, including: chloroethane; chloromethane; dichlorodifluoromethane; cis-1,3-dichloropropylene; tetrachloroethylene; 1,1,1-trichloroethane; trichloroethylene; and trichlorofluoromethane. These and other volatile organics continue to be detected sporadically in the detection monitoring wells at concentrations below primary water quality standards.

CONSTRUCTION AND ENGINEERED ALTERNATIVE

38. On 17 June 1993, the State Water Resources Control Board adopted Resolution No. 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under Title 40, Code of Federal Regulations, Part 258 (Subtitle D).

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39. Resolution No. 93-62 requires the construction of composite liner systems at municipal solid waste landfills that receive wastes after 9 October 1993. The prescriptive standard for a composite liner system consists of a minimum 40 mil thick (60 mil for HDPE) upper synthetic flexible membrane component and lower soil component of compacted clay a minimum of two feet thick with a hydraulic conductivity not to exceed 1×10^{-7} cm/sec.
40. Resolution No. 93-62 also allows the Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution No. 93-62 requires that the engineered alternative be of a composite design similar to the prescriptive standard.
41. Section 20080(b) of Title 27 allows the Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Section 20080(c)(1) and (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with 20080(b)(2) of Title 27.
42. Section 13360(a)(1) of the California Water Code allows the Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
43. The Discharger submitted a design plan for the proposed expansion of the waste management facility in a Report of Waste Discharge, dated 21 January 1997. The Discharger proposes to construct Module 5, a 12-acre composite-lined expansion area adjacent to the southern edge of Module 4, and Module 6, a 16-acre expansion area adjacent to the southern edge of Module 3. The design proposed the construction of an engineered alternative in lieu of the prescriptive liner design specified in Resolution No. 93-62.
44. The engineered alternative proposed by the Discharger for the bottom liner of the waste management unit consists of, in ascending order: a subgrade layer compacted to 95% of the maximum dry density; a geosynthetic clay liner (GCL); and a 60 mil high density polyethylene (HDPE) single-textured geomembrane (textured side down). The design includes a geocomposite composed of a drainage geonet and a filter geotextile atop the HDPE geomembrane, on which a two-foot thick soil operations layer will be placed.

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The GCL will consist either of a 5 mm thick layer of sodium bentonite sandwiched between two nonwoven geotextiles (geotextile-type), or the bentonite layer affixed to a double-textured geomembrane by chemical adhesive (geomembrane-type). The geotextile-type GCL will be needle-punched or lock-stitched together through the bentonite layer to form a stable composite. The geomembrane-type GCL will be installed with the geomembrane side down, in contact with the subgrade. Overlaps of the GCL panels will be a minimum of 6 and 12 inches along lengthwise seams for geotextile-type and geomembrane-type, respectively, and 12 and 18 inches at the end seams for geotextile-type and geomembrane-type, respectively.

45. Side slope liners are proposed to be constructed of the same materials and in the same sequence and manner as the bottom liner system, with the exception of the subgrade. The subgrade for side slopes will not be over excavated and replaced with an engineered fill. It will be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a surface that is smooth and free from rocks, sticks, and other debris that could damage or otherwise limit the performance of the geosynthetic clay layers and/or geomembrane.
46. The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonable and unnecessarily burdensome when compared to the proposed engineered alternative design. There is no clay source on-site or nearby and the cost of importing clay from off-site or mixing on-site soils with bentonite would cost substantially more than the alternative design.
47. A leachate collection and removal system (LCRS) is to be installed above the HDPE geomembrane at the midpoint of the toe of the south slope of each module liner system. The system will consist of a collection sump in which extraction piping and drainage gravel will be installed. In addition, a leachate collection trench will be constructed along the toe of the south slope. The sump will be lined with the GCL, the geomembrane, and two layers of the geotextile. The sump will be filled with Class 1, Type A drainage gravel, over which the geonet, the geotextile and the operations layer will be placed. Each module's liner system will be gently sloped at 1% toward the south end and inward toward the module's centerline to allow gravity drainage of leachate through the geonet toward the leachate collection trench and sump. The trench will slope inward toward the sump.

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48. A pan lysimeter will be installed beneath the liner system for the purposes of vadose zone monitoring. The pan lysimeter will consist of: 1) an underlying 60-mil HDPE liner on a prepared subgrade below the leachate sump(s) and the leachate collection and removal system troughs; 2) perforated or slotted 3-inch diameter HDPE piping wrapped with a filter fabric and encased in drainage rock; and 3) an overlying geonet.
49. Construction will proceed only after all applicable construction quality assurance plans have been approved by Board staff.

CEQA CONSIDERATIONS

50. The action to revise waste discharge requirements for this facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code §21000, et seq., and the CEQA guidelines, in accordance with Title 14, CCR, §15301, et seq.

OTHER CONSIDERATIONS

51. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated regulations (Title 40, Code of Federal Regulations, Parts 257 and 258, federal municipal solid waste [MSW] regulations or Subtitle D) that apply, in California, to dischargers who own or operate Class II or Class III landfill units at which municipal solid waste is discharged. The majority of the federal MSW regulations became effective on the Federal Deadline, which was on 9 October 1993. These requirements implement the prescriptive standards and performance goals of Subtitle D.
52. These requirements implement the prescriptive standard and performance goals of Title 27, California Code of Regulations, §20005 et seq. (Title 27).
53. These requirements implement the *Water Quality Control Plan for the Tulare Lake Basin, Second Edition*.
54. These requirements implement State Water Resources Control Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste, which implement the federal Subtitle D regulations.
55. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

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56. The Board has notified the Discharger and interested agencies and persons of its intention to revise the waste discharge requirements for this facility.
57. In a public hearing, the Board heard and considered all comments pertaining to this facility and discharge.

IT IS HEREBY ORDERED that Order No. 90-182 is rescinded, and Attachment 1 of Order No. 93-200 is amended to delete the American Avenue Landfill, which is on line No. 54, and that the Fresno County Public Works Department, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of "hazardous waste" or "designated waste" at this facility is prohibited. For the purposes of this Order, the term "hazardous waste" is as defined in Title 23, California Code of Regulations, Section 2510 et seq. and "designated waste" as defined in Title 27, California Code of Regulations, Section 20005 et seq. (Title 27).
2. The discharge of wastes outside of a waste management unit or portions of a waste management unit specifically designed for their containment is prohibited.
3. The discharge of solid waste, liquid waste, leachate, or waste constituents to surface waters, ponded water, surface water drainage courses, or groundwater is prohibited.
4. The discharge of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids), except dewatered sewage or water treatment sludge above a composite liner as provided in §20220(c) of Title 27, is prohibited.
5. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity is prohibited.
6. The discharge of waste within 100 feet of surface waters is prohibited.

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7. The discharge shall not cause the pollution or degradation of groundwater via the release of waste constituents in either liquid or gaseous phase.
8. The discharge of wastes shall not cause the pollution or degradation of any water supply.
9. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:
 - a. require a higher level of containment than provided by the unit; or
 - b. are restricted hazardous wastes; or
 - c. impair the integrity of containment structures;is prohibited.
10. The discharge shall not cause any increase in the concentration of waste constituents in soil or other geologic materials outside of the waste management unit if such waste constituents could migrate to waters of the State and cause a condition of degradation, pollution, or nuisance.
11. The discharge of waste to a waste management unit after it is closed is prohibited.

B. DISCHARGE SPECIFICATIONS

1. Wastes shall only be discharged to either:
 - a. that portion of an existing waste management unit that was permitted and/or received wastes prior to the Federal Deadline of 9 October 1993; or
 - b. to an area equipped with a composite liner containment system which meets the requirements for both liners and leachate collection and removal systems specified below.

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2. A minimum separation of 5 feet shall be maintained between the base of the wastes and the highest anticipated elevation of underlying groundwater, including the capillary fringe.
3. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control, construction, and, after closure, to the minimum amount necessary to irrigate cover vegetation or for other uses approved by Board staff.
4. Collected landfill leachate shall be discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the disposal of designated waste.
5. Collected gas condensate from landfill gas control systems shall be discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the disposal of designated waste.
6. Neither the treatment nor the discharge of wastes shall cause a pollution or nuisance as defined by the California Water Code, §13050.
7. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order.

C. FACILITY SPECIFICATIONS

1. Waste management units and containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping as a result of a 100-year, 24-hour precipitation event.
2. Precipitation and drainage control systems shall be designed, constructed, and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under the 100-year, 24-hour precipitation conditions.
3. Cover materials shall be graded to divert precipitation from the waste management unit, to prevent the ponding of surface water over wastes, and to resist erosion as a result of a 100-year, 24-hour precipitation event.

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4. Waste management units or portions of waste management units shall be designed, constructed, and operated in compliance with precipitation and flood conditions contained in the Standard Provisions and Reporting Requirements referenced in Provision F.5 below.
5. All drainage control systems shall be designed and constructed to prevent the ponding of water above wastes.
6. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes.
7. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion.
8. A minimum thickness of 6 inches of on-site cover soil shall be maintained over all but the active disposal area of the waste management unit. This area shall be properly graded and drained to prevent ponding and infiltration. The active disposal area shall be confined to the smallest practicable area based on the anticipated quantity of waste discharge and other waste management operations, and shall be covered daily with a minimum of 6 inches of on-site soils, or an alternative daily cover material approved by Board staff.
9. Annually, prior to **1 October** and **within 7 days** following a major storm event, all precipitation and drainage control systems shall be inspected. **By 31 October** of each year, or **within 30 days** of a major storm event, any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes.
10. **By 15 November** of each year, or **within 45 days** of a major storm event, the Discharger shall submit an annual report to the Board describing the results of the inspection(s) and the measures taken to maintain the precipitation and drainage control systems.
11. The Discharger shall immediately notify the Board of any flooding, unpermitted offsite discharge, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

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12. The Discharger shall submit a *Storm Water Pollution and Prevention Plan* **prior** to the discharge of wastes to a newly constructed waste management unit or to an expansion of an existing waste management unit, for Board staff for review and approval. The Plan shall include a report demonstrating adequate design, construction, and operation of a facility liquid management system for protection from storm events, including precipitation and drainage controls, in accordance with Facility Specifications C.1 - C.8.
13. The site shall be provided with at least two permanent monuments, installed by a licensed land surveyor or registered civil engineer, from which location and elevation of all wastes, containment structures, and monitoring facilities can be determined throughout the life, closure, and post-closure maintenance periods.

D. CONSTRUCTION SPECIFICATIONS:

1. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of a waste management unit or portion of a waste management unit.
2. Materials used to construct the leachate collection and removal system shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the operating life, closure, and post-closure maintenance period of a waste management unit or portion of a waste management unit.
3. The Discharger shall submit for Board staff review and approval **prior to** construction, design plans and specifications for new waste management units and expansions of existing waste management units that include the following:
 - a) A Construction Quality Assurance Plan demonstrating that the proposed waste management unit will be constructed according to the approved specifications and plans, and shall provide quality control on the materials and construction practices used in construction and prevent the use of inferior products and/or materials which do not meet the approved design plans or specifications; and

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- b) A geotechnical evaluation of the area soils, evaluating their use as the foundation layer; and
 - c) A vadose zone monitoring system that includes geomembrane-lined pan lysimeters installed beneath the leachate collection and removal system collection drains and sump(s).
4. If the prescriptive standard clay layers are used in a liner system, then the hydraulic conductivities for the clay determined through laboratory methods shall be confirmed by a Sealed Double-Ring Infiltrometer (SDRI) field test, or an equivalent field test method approved by Board staff, of a test pad constructed in a manner duplicating the clay liner construction of the waste management unit or expansion portion of the waste management unit. Test pad construction methods, quality assurance/quality control procedures, and testing shall be in accordance with a construction quality assurance plan approved by Board staff and shall be sufficient to ensure that all parts of the liner meet the hydraulic conductivity and compaction requirements.
5. Both the bottom liner and side slope liner of all new waste management units and expansion areas of existing waste management units shall be constructed in accordance with one of the following composite liner designs:
- a) The prescriptive standard design which consists of a lower compacted soil layer that is a minimum of two feet thick with a hydraulic conductivity of 1×10^{-7} cm/sec or less and a minimum relative compaction of 90%. Immediately above the compacted soil layer, and in direct and uniform contact with the soil layer, shall be a synthetic flexible membrane component that shall be at least 40-mil thick (or at least 60-mil thick if composed of high density polyethylene [HDPE]); *or*
 - b) An engineered alternative liner system that is comprised, in ascending order, of the following:
 - 1) An eighteen-inch thick engineered soil foundation layer that shall be constructed of select fine-grained soil materials which are compacted to attain a hydraulic conductivity of 1×10^{-5} cm/sec or less, or meet the following gradation criteria:
 - (a) A maximum size of 3/8-inch;

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- (b) At least 30% of the material, by dry weight, passing the No. 200 U.S. Standard sieve;
 - (c) A gradation series (i.e., well-graded) that is amenable to compaction; and
 - (d) The foundation layer shall be compacted in lifts of six inches or less to 90% of maximum dry density and at 0% to 4% wet of optimum moisture content, in accordance with the approved construction quality assurance plan.
 - 2) A nonwoven bottom geotextile, which may be part of the geosynthetic clay layer (GCL).
 - 3) A GCL that shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface, long-term creep shear, and bearing capacity.
 - 4) A 60-mil thick synthetic flexible membrane of HDPE; *or*
 - c) An engineered alternative liner system as provided by 20080(b) and (c) of Title 27, which must be a composite liner that meets the performance goals of the prescriptive design in option a) above, and has been approved by the Executive Officer.
6. If the Discharger proposes to construct a liner system in which a GCL is placed on top of the subgrade, the subgrade for the bottom and the side slopes of the waste management unit shall be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.
7. Hydraulic conductivities of liner materials shall be determined by laboratory tests using solutions with similar properties as the fluids that will be contained. Hydraulic conductivities of cover materials shall be determined by laboratory tests using water. Hydraulic conductivities of compacted earthen liners and caps determined through laboratory methods shall be confirmed by field testing in accordance with the Standard Provisions and Reporting Requirements (August 1997), Standard Conditions, Construction Condition No. 3 (p. 16). Construction

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methods and quality assurance procedures shall be sufficient to ensure that all parts of the liner and cap meet the hydraulic conductivity and compaction requirements.

8. All new waste management units or expansion areas of existing waste management units shall have a blanket-type leachate collection and removal system, designed and operated to prevent the development of one foot or more of hydraulic head on the liner system at any time.
9. The leachate collection and removal system shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by the waste management unit or portion of the waste management unit and to prevent the buildup of hydraulic head on the underlying materials. The depth of fluid in any leachate collection and removal system sump shall be maintained as low as feasible and no greater than the minimum needed for safe pump operation.
10. Leachate generated by any waste management unit or portion of a waste management unit shall not exceed 85% of the design capacity of the sump pump. If leachate generation exceeds this value, or if the depth of fluid in the leachate removal and collection system exceeds the minimum needed for pump operation, or if the monitoring reveals substantial or progressive increases above the design anticipated daily volume of leachate generated by the waste management unit or portion of the waste management unit, the Discharger shall immediately notify the Board in writing **within seven days**. The notification shall include a timetable for remedial or corrective action necessary to reduce leachate production.
11. Following the completion of construction of a waste management unit or portion of a waste management unit, and prior to discharge onto the newly constructed liner system, a construction report shall be submitted for Board staff review and approval. The report shall be certified by a registered civil engineer or a certified engineering geologist. It shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, and with the prescriptive standards and performance goals of Title 27.

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The report for the waste management unit shall include as a minimum, but not be limited to, the following:

- a) Test results on the chemical and geotechnical properties of materials used in the containment structure, as specified in these waste discharge requirements.
 - b) Test results on the permeability of the clay liner if the prescriptive standard clay layer is used in the liner system.
 - c) Test results on the compatibility of the waste with the liner system.
 - d) Construction quality assurance and quality control procedures and results for all aspects of liner construction.
 - e) A geologic map and geologic cross-sections which show mappable lithologic units and structural features in relation to the waste management unit.
12. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during the construction of a liner system. For construction of soil components other than those of a liner system (i.e., subgrade), the third party may provide verification only of the construction quality assurance, provided the monitoring and testing are performed by personnel appropriately certified to perform such work.
13. New waste management units and lateral expansions of existing waste management units shall not be located in wetlands unless the Discharger has successfully completed, and the Executive Officer has approved, all demonstrations required for such discharge under 40 CFR, Part 258.12(a).
14. Partial or final closure of new, existing, or portions of a classified waste management unit shall be in compliance with the applicable provisions of Title 27. Classified waste management units or portions of waste management units shall be closed in accordance with the approved closure and post-closure maintenance plan and closure waste discharge requirements adopted by the Board. The

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Discharger shall notify the Board in writing of the waste management unit(s) or portion of waste management unit(s) to be closed at least **180 days** prior to the intended beginning of any partial or final closure activities. Closure shall not proceed in the absence of closure waste discharge requirements.

E. DETECTION MONITORING SPECIFICATIONS

1. The Discharger shall submit a groundwater detection monitoring report demonstrating compliance with Subchapter 3 of Chapter 3 of Title 27. The program is subject to approval by Board staff. The report shall include a description of the installation of additional background and detection monitoring wells, as proposed.
2. The Discharger shall comply with the detection monitoring provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. 97-200. Detection monitoring for a new waste management unit or an expansion of an existing waste management unit shall be installed, operational, and the first round of samples collected **prior to the** discharge of wastes.
3. The Water Quality Protection Standard, as defined in §20390 of Title 27, shall consist of constituents of concern, their concentration limits, the point of compliance, and all water quality monitoring points. Constituents of concern shall include all waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the landfill. Concentration limits shall consist of the background concentrations of each constituent of concern or concentrations greater than background, pursuant to §20400 of Title 27.
4. The Discharger shall comply with the Water Quality Protection Standard which is specified in Monitoring and Reporting Program No. 97-208 and the Standard Provisions and Reporting Requirements, dated August 1997, which are attached to and made part of this order.
5. Organic compounds which are not naturally occurring have a background value of zero. The Water Quality Protection Standard for volatile organic compounds shall be taken as the detection limit of the analytical method used (i.e., 8260 and 8270). Evidence of exceeding the standard occurs when the constituent is detected by the appropriate method.

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6. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. 97-208.
7. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. 97-208 and §20415(e) of Title 27.
8. Methane and other landfill gases shall be adequately vented, removed from the waste management unit, or otherwise controlled to prevent the danger of explosion, adverse health effects, nuisance conditions, or the impairment of the beneficial uses of surface water or groundwater due to migration through the vadose (unsaturated) zone.

F. PROVISIONS

1. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit or portion of a waste management unit, and the manner and location of the discharge. Such records shall be maintained at the facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be properly stored for future reference.
2. The Discharger shall maintain a copy of this order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel upon request.
3. The Discharger shall comply with all applicable provisions of Title 27 and 40 CFR Part 258 that are not specifically referred to in this Order.
4. The Discharger shall comply with Monitoring and Reporting Program No. 97-208, which is incorporated into and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities, precipitation and drainage controls, the groundwater monitoring system, leachate

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from the waste management unit(s), the vadose zone and surface water monitoring systems, throughout the active life of the waste management unit and the post-closure maintenance period.

5. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated August 1997, which are hereby incorporated into this Order.
6. A violation of any of the Standard Provisions and Reporting Requirements or the Monitoring and Reporting Program is a violation of these waste discharge requirements.
7. **Prior to** discharging to a new waste management unit or to an expansion area of an existing waste management unit, the Discharger shall submit to the Board and the California Integrated Waste Management Board for approval, a report (or a revision as needed) describing a Periodic Load Checking Program to be implemented to preclude the discharge of "hazardous wastes" and "designated wastes."
8. The Discharger or persons employed by the Discharger shall comply with all notice and reporting requirements of the State Department of Water Resources with regard to the construction, alteration, destruction, or abandonment of all monitoring wells used for compliance with this Order as required by §13750 through §13755 of the California Water Code.
9. The Discharger shall maintain waste containment facilities and precipitation and drainage controls, and shall continue to monitor groundwater in accordance with Monitoring and Reporting Program No. 97-208 throughout the active life of the waste management unit and the post-closure maintenance period.
10. The Discharger shall have the continuing responsibility to assure the protection of the beneficial uses of ground and surface waters from gases and leachate generated by discharged waste during the active life, closure and post-closure maintenance period of the waste management unit(s) and during the subsequent use of the property for other purposes.
11. In the event of any change in control or ownership of the land or waste discharge facilities described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

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To assume operation under this Order, the succeeding owner or operator must apply in writing to the Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Board, and a statement. The statement shall comply with the signatory requirements contained in Reporting Requirements No. 5 of the Standard Provisions and Reporting Requirements and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved by the Board.

12. The Discharger shall notify the Board in writing of any proposed change in ownership or responsibility for construction or operation of the waste management unit. The Discharger shall also notify the Board of a material change in the character, location or volume of the waste discharge and of any proposed expansions or closure plans. This notification shall be given **90 days** prior to the effective date of the change and shall be accompanied by an amended Report of Waste Discharge and any technical documents that are needed to demonstrate continued compliance with these waste discharge requirements.
13. The Discharger shall submit an **annual** status report regarding the financial assurances for corrective action and closure, beginning with the adoption of these requirements, that either validates the ongoing viability of the financial instrument or proposes and substantiates any needed changes.
14. The Board will review this Order periodically and will revise these waste discharge requirements when necessary.
15. The Discharger shall submit a copy of the Record of Survey for the control monuments required in Facility Specification C.13 in accordance with the time schedule outlined in Provision F.16.
16. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

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<u>Task</u>	<u>Compliance Date</u>
(a) Record of Survey Monuments (See Facility Specification C.13) Submit a copy of Record of Survey of control monuments	1 January 1998
(b) Construction Report (See Construction Specification D.11) Submit a construction report upon completion of a new waste management unit, including a geologic map and geologic cross-sections.	For review and approval prior to discharge
(c) Detection Monitoring Network (See Detection Monitoring Specification E.1) Submit a groundwater detection monitoring report demonstrating compliance with Subchapter 3 of Chapter 3 of Title 27.	1 September 1998

I, GARY M. CARLTON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 19 September 1997.


GARY M. CARLTON, Executive Officer

Dec:9/19/97 AMENDED
Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 97-200
FOR
COUNTY OF FRESNO
FOR
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Compliance with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the Standard Provisions and Reporting Requirements dated August 1997, is ordered by Waste Discharge Requirements Order No. 97-208.

Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes noncompliance with the Waste Discharge Requirements and with the California Water Code, which can result in the imposition of civil monetary liability.

A. REQUIRED MONITORING REPORTS

<u>Report</u>	<u>Due</u>
1. Groundwater Monitoring (Section D.1)	See Table I
2. Annual Monitoring Summary Report (Standard Provisions and Reporting Requirements)	Annually
3. Solid Waste Monitoring (Section D.2)	Quarterly
4. Unsaturated Zone Monitoring (Section D.3)	See Table II
5. Leachate Monitoring (Section D.4)	See Table III
6. Facility Monitoring (Section D.6)	As necessary
7. Response to a Release (Standard Provisions and Reporting Requirements)	As necessary

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B. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. Data shall also be submitted in a digital database format acceptable to Board staff. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. A short discussion of the monitoring results, including notations of any water quality violations, shall precede the tabular summaries.

Field and laboratory tests shall be reported in each monitoring report. Monthly, quarterly, semiannual, and annual monitoring reports shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made. The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Board.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Quarterly	Last Day of Month	by Quarterly Schedule
Quarterly	Quarterly	31 March	31 May
		30 June	31 August
		30 September	30 November
		31 December	31 January
Semi-Annually	Semi-Annually	30 June	31 August
		31 December	28 February
Annually	Annually	31 December	28 February

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The annual report to be submitted to the Board shall contain both tabular and graphical summaries of the monitoring data obtained during the previous twelve months, so as to show historical trends at each well. The report shall include a discussion of compliance with the waste discharge requirements and the water quality protection standard.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit, the water quality protection standard consists of a list of constituents of concern and monitoring parameters, concentration limits for each constituent of concern, the point of compliance, and all monitoring points.

The Discharger shall submit a proposed water quality protection standard for review and approval within one year from the date of adoption of this Monitoring and Reporting Program by the Board. Board staff shall review the data and the proposed water quality protection standard in determining the final water quality protection standard for each monitored medium.

The report shall:

- a) Identify **all distinct bodies of groundwater** that could be affected in the event of a release from a waste management unit or portion of a waste management unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the waste management facility.
- b) Include a map showing the monitoring points and background monitoring points for the saturated and unsaturated zones and showing the point of compliance in accordance with §20405 of Title 27.
- c) Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the water quality protection standard.

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2. Constituents of Concern

The constituents of concern are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit. The constituents of concern for all waste management units at the facility are those listed in Table V. The Discharger shall monitor all constituents of concern in Table V every five years, or more frequently as required in accordance with a Corrective Action Program.

a. Monitoring Parameters

Monitoring parameters are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables I through III for the specified monitored medium.

3. Concentration Limits

The concentration limits for each constituent of concern are as follows:

- a. for naturally occurring constituents of concern, the concentration limit shall be the calculated statistical concentration limit.
- b. for anthropogenic (not naturally occurring) constituents, which have no natural and, therefore, no background values, the concentration limit (water quality protection standard) shall be the detection limit of the analytical method(s) used.

The Discharger shall use the statistical method approved by Board staff and the groundwater quality data obtained from the detection monitoring program to revise the concentration limits annually. The Discharger shall submit the revised concentration limits to Board staff for review and approval in the annual monitoring report.

4. Point of Compliance

The point of compliance for each waste management unit is the vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit.

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a. Monitoring Points

The monitoring points, or a revision thereof, for each monitored medium shall be approved or specified by Board staff. All downgradient wells approved for groundwater monitoring shall constitute the monitoring points for the groundwater quality protection standard. All approved monitoring wells, unsaturated zone monitoring devices, and leachate monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables I through III.

5. Compliance Period

The compliance period for each waste management unit shall be the number of years equal to the active life of the waste management unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

D. MONITORING

The Discharger shall comply with the detection monitoring provisions of Title 27 for groundwater and the unsaturated zone, in accordance with Detection Monitoring Specifications E.2 and E.3 of waste discharger requirements Order No. 97-208. Detection monitoring for a new facility, a new waste management unit, or an expansion of an existing waste management unit shall be installed, operational, and the first round of samples collected **prior to** the discharge of wastes. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which includes quality assurance/quality control standards, that has been approved by Board staff.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table V.

1. Groundwater

The Discharger shall install and operate a groundwater detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance

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with a Detection Monitoring Plan approved by Board staff. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

The Discharger shall determine groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results quarterly, including the times of highest and lowest elevations of the water levels in the wells.

Groundwater samples shall be collected from the point of compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the frequency specified in Table I. All monitoring parameters shall be graphed so as to show historical trends at each well. The monitoring parameters shall also be evaluated annually with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram or a Piper graph. Samples for the constituents of concern specified in Table V shall be collected and analyzed every five years.

2. Solid Waste Monitoring

The Discharger shall monitor all wastes discharged to the landfill on a monthly basis and report to the Board as follows:

<u>Parameter</u>	<u>Units</u>	<u>Reporting Frequency</u>
Quantity discharged (by module or area)	cubic yards or tons	Quarterly
Type of material discharged	---	Quarterly
Source(s) of material discharge	---	Quarterly
Minimum elevation of discharge	feet & tenths M.S.L.	Quarterly
Capacity of landfill/module remaining	percent	Annually

3. Unsaturated Zone Monitoring

The Discharger shall install and operate an unsaturated zone detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27

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shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan.

Unsaturated zone samples shall be collected from the monitoring devices and background monitoring devices of the approved unsaturated zone monitoring system. Samples shall be collected and analyzed for the listed constituents in accordance with the frequency specified in Table II. All monitoring parameters shall be graphed so as to show historical trends at each monitoring point. Samples for the constituents of concern specified in Table V shall be collected and analyzed every five years.

The pan lysimeters, or other unsaturated zone monitoring devices, shall be checked monthly for fluid and monitoring shall include the volume of fluid recovered. Unsaturated zone monitoring reports shall be included with the corresponding semi-annual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the water quality protection standard.

4. Leachate Monitoring

All waste management unit leachate collection and removal system sumps shall be inspected weekly for leachate generation. Upon detection of leachate in a previously dry leachate collection and removal system, leachate shall be sampled and analyzed for the constituents listed in Table III. Leachate monitoring shall be conducted as specified in Table III. The constituents of concern list shall include all constituents listed in Table V. The quantity of leachate pumped from each sump shall be measured continuously and reported as Leachate Flow Rate (in gallons/day).

5. Facility Monitoring

a. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the Standard Observations defined in the

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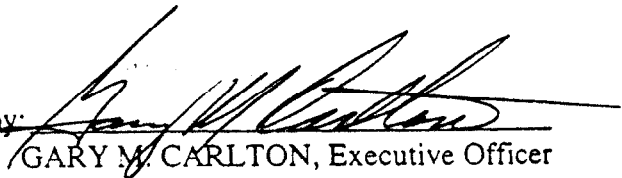
Standard Provisions and Reporting Requirements (Definition 24). Any necessary construction, maintenance, or repairs shall be completed within 15 days of the inspection. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented.

b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage immediately following *major storm events*. Necessary repairs shall be implemented within 15 days of the inspection. The Discharger shall report any damage and subsequent repairs within 30 days of completion of the repairs.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by:


GARY M. CARLTON, Executive Officer

19 September 1997

(Date)

Dee:9/19/97 AMENDED

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TABLE I
GROUNDWATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	"C	Quarterly
Specific Conductance	µmhos/cm	Quarterly
pH	pH units	Quarterly
Turbidity	Turbidity units	Quarterly
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-annual
Chloride	mg/L	Semi-annual
Carbonate	mg/L	Semi-annual
Bicarbonate	mg/L	Semi-annual
Nitrate - Nitrogen	mg/L	Semi-annual
Sulfate	mg/L	Semi-annual
Silicate	mg/L	Semi-annual
Aluminum	mg/L	Semi-annual
Calcium	mg/L	Semi-annual
Copper	mg/L	Semi-annual
Iron	mg/L	Semi-annual
Magnesium	mg/L	Semi-annual
Manganese	mg/L	Semi-annual
Potassium	mg/L	Semi-annual
Sodium	mg/L	Semi-annual
Volatile Organic Compounds (USEPA Method 8260, see Table IV)	µg/L	Semi-annual

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TABLE I
GROUNDWATER DETECTION MONITORING PROGRAM
Continued

Constituents of Concern (see Table V)

Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

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TABLE II
UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Monitoring Parameters		
Volatile Organic Compounds (USEPA Method 8260, see Table IV)	µg/L	Semi-annual
Methane	µg/L	Semi-annual

PAN LYSIMETERS (or other vadose zone monitoring device)

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Specific Conductance	µmhos/cm	Semi-annual
pH	pH units	Semi-annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-annual
Chloride	mg/L	Semi-annual
Sulfate	mg/L	Semi-annual
Nitrate - Nitrogen	mg/L	Semi-annual
Volatile Organic Compounds (USEPA Method 8260, see Table IV)	µg/L	Semi-annual

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TABLE II

UNSATURATED ZONE DETECTION MONITORING PROGRAM
Continued

Constituents of Concern (see Table V)

Total Organic Carbon	mg/L	5 years
Carbonate	mg/L	5 years
Bicarbonate Alkalinity	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

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TABLE III
LEACHATE DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Total Flow	Gallons	Monthly
Flow Rate	Gallons/Day	Monthly
Specific Conductance	µmhos/cm	Monthly
pH	pH units	Monthly
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Quarterly
Chloride	mg/L	Quarterly
Sulfate	mg/L	Quarterly
Nitrate - Nitrogen	mg/L	Quarterly
Volatile Organic Compounds (USEPA Method 8260, see Table IV)	µg/L	Quarterly
Constituents of Concern (see Table V)		
Total Organic Carbon	mg/L	5 years
Carbonate	mg/L	5 years
Bicarbonate Alkalinity	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

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TABLE IV
MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

pH
Total Dissolved Solids
Specific Conductivity
Chloride
Sulfate
Nitrate nitrogen

Constituents included in VOC_{water}:

USEPA Method 8260

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis-1,2-Dichloroethene)

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TABLE IV
MONITORING PARAMETERS FOR DETECTION MONITORING
Continued

trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK: 2-Butanone)
Methyl iodide (Iodomethane)
4-Methyl-2-pentanone (Methyl isobutylketone)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,1,1-Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

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TABLE V
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Inorganics (dissolved):

	<u>USEPA Method</u>
Antimony	6010
Barium	6010
Beryllium	6010
Cadmium	6010
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Arsenic	7061
Lead	7421
Mercury	7470
Nickel	7520
Selenium	7741
Thallium	7841
Cyanide	9010
Sulfide	9030

Volatile Organic Compounds:

USEPA Method 8260

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)

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TABLE V

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1 -Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)

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TABLE V
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Methyl iodide (Iodomethane)
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene 1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semi-Volatile Organic Compounds:

USEPA Method 8270 - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene

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TABLE V
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine

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TABLE V

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone

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TABLE V

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylNitrosamine)
N-Nitrosodiethylamine (DiethylNitrosamine)
N-Nitrosodimethylamine (DimethylNitrosamine)
N-Nitrosodiphenylamine (DiphenylNitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylNitrosamine)
N-Nitrosomethylethylamine (MethylethylNitrosamine)
N-Nitrosopiperidine
N-Nitrosospyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide

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TABLE V
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichloropheno
1,2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Chlorophenoxy Herbicides:

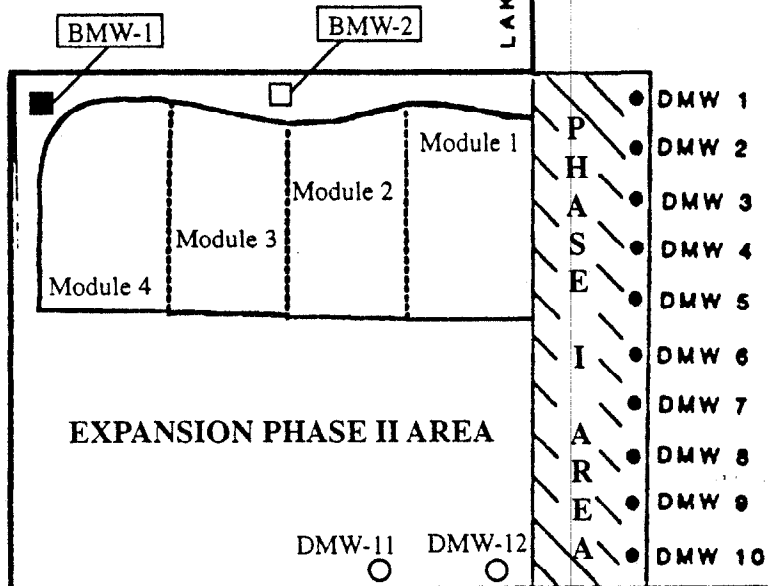
USEPA Method 8150

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organophosphorus Compounds:

USEPA Method 8141

0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate



LEGEND

- BMW-1 Existing background monitoring well
- DMW-1 Existing downgradient monitoring well
- BMW-2 Proposed background monitoring well
- DMW-12 Proposed downgradient monitoring well



ATTACHMENT B

COUNTY OF FRESNO
AMERICAN AVENUE MUNICIPAL SOLID WASTE LANDFILL
FRESNO COUNTY

INFORMATION SHEET

COUNTY OF FRESNO AMERICAN AVENUE MUNICIPAL SOLID WASTE LANDFILL FRESNO COUNTY

The American Avenue Solid Waste Disposal Site is owned and operated by the County of Fresno. The site totals about 440 acres approximately 5 miles southwest of the City of Kerman. The site consists of a 30-acre unlined unit (Phase I), a 160-acre unit being developed in phases as a composite-lined Class III waste management unit (Phase II), and approximately 250 acres east and north of the unlined unit for future development in phases as a composite-lined Class III WMU (Phase III).

The facility is situated in a topographically flat region of the San Joaquin Valley. Soils underlying the site are interbedded sands, silty-sands, sandy-silts, and silts. In-situ soil permeabilities are reported to be in the range of 1×10^{-7} and 1×10^{-5} cm/s. Groundwater is found below 100 feet in depth. The groundwater gradient in the area of the site is about 2.5 feet in 1,000 feet toward the southeast. The quality of underlying groundwater is highly variable with electrical conductivity ranging from 350 to 940 μ mhos/cm.

Groundwater quality is monitored by 11 monitoring wells adjacent to the unlined portion of the site. These requirements require the installation of additional monitoring wells to bring the existing groundwater monitoring system into compliance with Title 27 regulations.

The current lined portions of the site consist of Module 1 - lined with one foot of compacted clay overlaid by a 60-mil HDPE liner, and Modules 2, 3, and 4 - lined with two feet of compacted clay overlaid by a 60-mil HDPE liner. Each lined unit includes a leachate collection and removal system and unsaturated zone monitoring stations. The County is currently evaluating the use of geosynthetic clay liner (GCL) materials in lieu of compacted clay for future modules within the WMU.

Volatile organic constituents were first detected in groundwater when the detection monitoring wells were installed and continue to be detected sporadically in the detection monitoring wells at concentrations below primary water quality standards. The County needs to submit an Evaluation Monitoring Program proposal in accordance with Subchapter 3 of Chapter 3 of Title 27. The required proposal has not been submitted. Submission of the Evaluation Monitoring Program will be addressed in a Cleanup and Abatement order.

The action to update WDRs for this facility is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.), in accordance with 14 CCR, Section 15301.

Dec:9/19/97